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## Two New Species of *Larnax* (Solanaceae) from Ecuador

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**ABSTRACT.** Two new species of *Larnax* (Solanaceae) are described and illustrated. *Larnax andersonii* is a small shrub with unequal, geminate leaves and long, bifurcate hairs. It occurs along the eastern slopes of the Ecuadorian Andes. The flower structure of *L. andersonii* is similar to another Ecuadorian species, *L. suffruticosa*. *Larnax psilophyta*, a high-elevation species endemic to southern Ecuador, is a small-flowered, glabrous shrub with indurate, fleshy leaves that is often confused with *Deprea glabra*.

The genus *Larnax* (Miers) Hunziker, first described by Miers (1849), has 12 known species and is among a group of approximately 12 so-called "physaloid" genera in the large tribe Solaneae (Averett, 1979; D'Arcy, 1991). This group, which not surprisingly includes the large genus *Physalis* L., is united by having longitudinally dehiscent anthers, ovarial nectaries, and accrescent calyces that surround and either closely invest or inflate around the berry. Recent molecular systematic work suggests subtribal status of this physaloid clade may be justified (Olmstead & Palmer, 1992; Olmstead & Sweere, 1994).

Species of *Larnax* are single-trunked shrubs 30 cm–2 m tall. Although infrequent in most habitats, they easily are recognized by their plagiotropic upper stem and leaf growth and by the axillary fascicles of from 1 to several flowers per node. Corolla color ranges from cream to yellow to purple and is variable within species (Sawyer, unpublished). Fruits are fleshy, orange berries usually containing from 60 to over 100 small seeds. *Larnax* is taxonomically associated with the genus *Deprea* Rafinesque (Barboza & Hunziker, 1994; Hunziker, 1977). Heteranthery in *Larnax* species is one character that delimits this genus from *Deprea*. In species of *Deprea*, anthers in the same flower are of equal size, whereas in species of *Larnax*, the five anthers are grouped in arrays of either two or three different size classes. Other characters that separate these genera include the presence of thickened filament bases forming a stamen petalum (Barboza & Hunziker, 1991) in *Larnax* species (filament bases are never thickened in *Deprea*), and the degree of corolla fusion (in *Deprea* corollas are infundibular, the limb shorter than the tube; in *Larnax* co-

rollas are always rotate-campanulate, the limb always longer than the tube) (Barboza & Hunziker, 1994; Sawyer, unpublished).

Species of *Larnax* are tropical, Andean shrubs of limited distribution occurring from Colombia to northern Peru, with eight species in Ecuador, five of which are endemic. Recently, a new species was described extending the range into Venezuela (Benítez de Rojas & Martínez, 1995). Species of *Larnax* inhabit wet, premontane or montane forest edges and usually are found on slopes along streams.

In addition to the species described herein, the following ten species comprise the genus:

*Larnax harlingiana* Barboza & Hunziker. 1995. Kurtziana 24: 157–160. Distribution: Ecuador.

*Larnax hawkesii* Hunziker. 1977. Kurtziana 10: 7–50. Distribution: Colombia and Ecuador.

*Larnax hunzikeriana* Benítez & Martínez. 1995. Phytologia 78: 353–356. Distribution: Venezuela.

*Larnax lutea* Leiva. 1996. Arnaldoa 4: 15–22. Distribution: Peru.

*Larnax peruviana* (Zahlbruckner) Hunziker. 1977. Basionym: *Athenaea peruviana* Zahlbruck. 1892. Ann. K. K. Naturhist. Hofmus 7: 7. Distribution: Ecuador and Peru.

*Larnax purpurea* Leiva. 1996. Arnaldoa 4: 15–22. Distribution: Peru.

*Larnax sachapapa* Hunziker. 1977. Kurtziana 10: 7–50. Distribution: Colombia and Ecuador.

*Larnax steyermarkii* Hunziker. 1977. Kurtziana 10: 7–50. Distribution: Ecuador.

*Larnax subtriflora* (Ruiz & Pavón) Miers. 1849. Basionym: *Physalis subtriflora* Ruiz & Pavón. 1794. Fl. Per. 2: 42. Distribution: Peru.

*Larnax suffruticosa* (Dammer) Hunziker. 1977. Basionym: *Ioichroma suffruticosa* Dammer. 1905. Bot. Jahrb. 36: 386. Distribution: Ecuador.

***Larnax andersonii*** N. W. Sawyer, sp. nov. TYPE: Ecuador. Napo: km 25 of Hollín–Loreto road, finca entrance next to bridge over a quebrada in secondary pluvial forest, 950 m, 00°40'S, 77°40'W, 1 July 1995, Sawyer & Tirado 714 (holotype, MO; isotypes, CONN, US). Figure 1.

Inter quaterni species ceteris generis fructu involuto laxe calyce trichomatibus longis et interdum ramosis, ra-



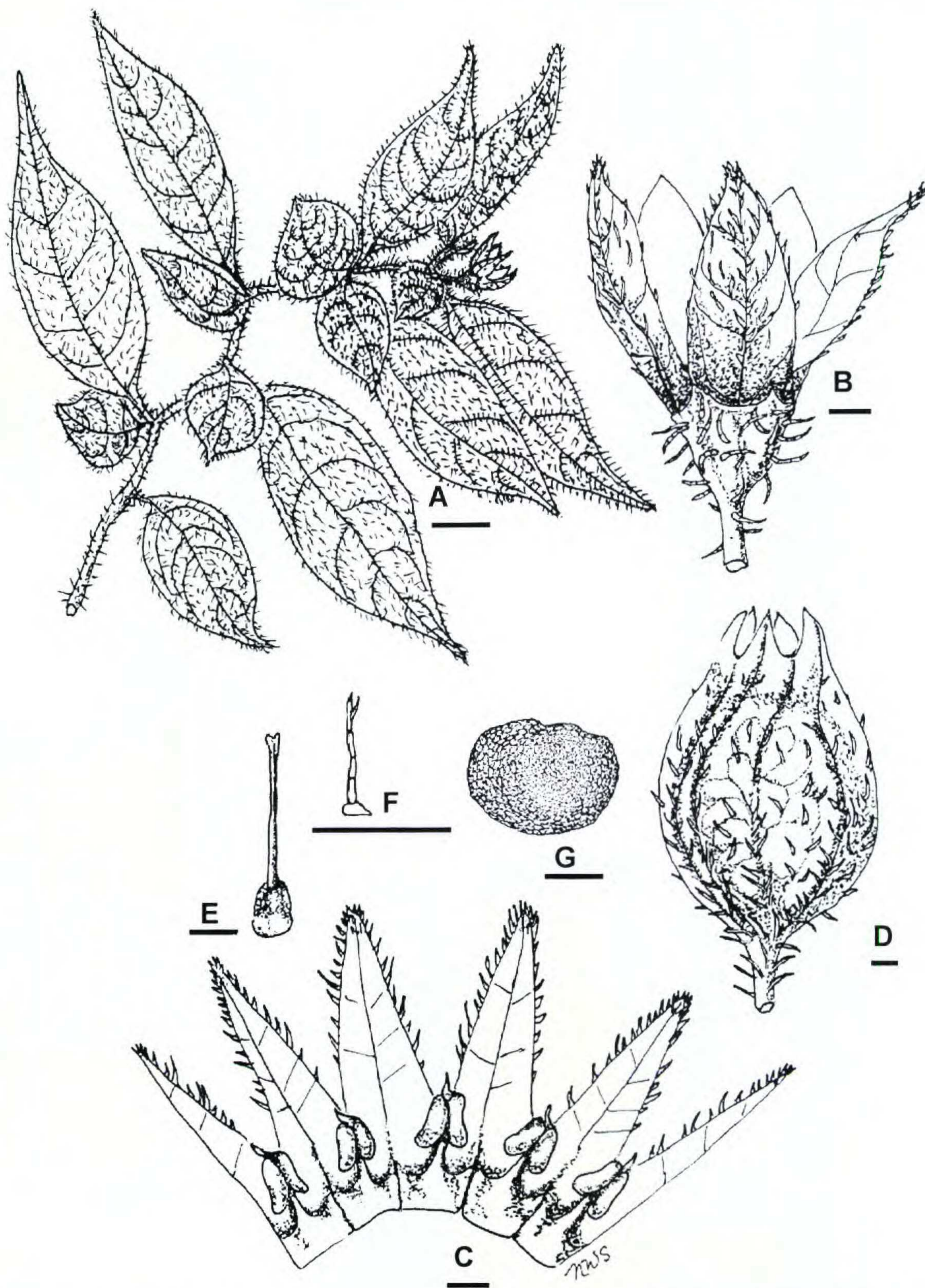


Figure 1. *Larnax andersonii* N. W. Sawyer (Sawyer 714). —A. Branch apex. Bar = 1 cm. —B. Mature flower. —C. Interior of mature corolla and androecium. —D. Mature fruiting calyx. —E. Mature gynoecium with annular nectary at base. —F. Bifurcate leaf trichome. —G. Mature seed. Bars B–F = 1 mm.

mis secundariis geniculatis, foliis geminatis disparibus, floribus solitariis et distalibus in ramis, corollis luteolis aut purpuratis, antheris apiculatis sed recedens ab isdem.

Suffrutescent perennial, 0.5–2 m tall. Stems branched, secondary branches geniculate. Stems and leaves villous-sericeous, covered with long, multicellular, simple or occasionally branched trichomes. Leaves membranous, entire, paired, unequal, the larger (major) elliptic, 4.5–11 cm long,

1.6–3.9 cm wide with 5–8 secondary veins, the smaller (minor) elliptic-ovate-ovate, 0.3–2.5 cm long, 0.6–1.9 cm wide. Leaves strigose-sericeous above, villous-sericeous below especially along veins, bifurcate hairs occurring occasionally along leaf margin and along veins; apex acuminate in major leaves, acute-mucronate in minor leaves, base oblique-equal, attenuate in major leaves, sometimes attenuate-truncate in minor leaves. Petiole



sericeous, 3–10 mm long on major leaves, 0.5–3 mm long on minor leaves. Inflorescence distal on the branch, axillary, typically solitary, occasionally paired. Flowers pendent on sericeous pedicels 3–5 mm long. Flowering calyx villous–sericeous, green, 1.5–2 mm long, 2.5–3 mm wide, margin ranging from broadly pyramidal at the 5 major veins to 5-lobed, lobes acute, <1 mm long. Corolla campanulate, 6–8 mm long, tube 2–3 mm long, lobes of the limb membranous, narrowly triangular, sparsely villous externally, densely tomentose along margin and at apex, bifurcate hairs occurring rarely externally and along margin, glabrous within. In shade plants, corolla pale yellow–cream–green; in sun plants, corolla violet with cream base. Stamens included. Filaments glabrous, filamentose, the free portion 1.6–2 mm long, adnate to the basal third of the corolla and there broadened and thickened into a stamen petalum with projections at the shoulders, separated from each other by the corolla vasculature, fused portion 0.9–1.8 mm long. Anthers white–pink, ovate with long apiculum, occurring in two size arrays of three large and two small, 1.3–1.6 mm long, 0.75 mm wide, slightly dorsifixed, base sagittate. Ovary glabrous, ovate, 1 mm long, less than 1 mm wide, ringed basally by a greenish yellow nectary. Style glabrous, 2–4 mm long, extending beyond anthers late in anthesis; stigma clavate–subbilobate, green–purple. Fruiting pedicels sericeous, 5 mm long. Fruiting calyx accrescent, loosely enveloping the fruit, open at the apex, green with dark green veins, villous, membranous, pyriform, 1.2–1.3 cm long, 0.8–1 cm wide, with scattered, two-celled glandular hairs within; lobes distinct, triangular, acute, unequal in length, to 2 mm long. Fruit an orange, fleshy berry containing 60–80 reniform, faveolate seeds to 2.8 mm diam.

A suite of characteristics are diagnostic for this species. They include the geniculate younger stems, a character present in many species of this group, and the distinctly unequal-geminate leaves on younger branches; the usually solitary flowers occurring distally on branches; the apiculate anthers also found in several species; and the long, sometimes bifurcate, multicellular hairs also found in *L. subtriflora* and *L. suffruticosa* (Sawyer, unpublished).

**Distribution.** In wet lower montane forest, usually on slopes next to streams. Limited to the eastern Andean slopes of north and central Ecuador, from 900 to 1500 m.

The specific epithet honors Gregory J. Anderson, whose dedicated and exhaustive research into the evolutionary and reproductive biology of the genus

*Solanum* sect. *Basarthrum*, notably his groundbreaking work on cryptic dioecy, warrants recognition. His exemplary, broad-scaled investigations ranging in context from experimental research to applied systematic studies, including studies of pollen and hair types, have provided both inspiration and guidance for his students and colleagues.

**Paratypes.** ECUADOR. **Napo:** Archidona, faldas al sur del Volcán Sumaco, Carretera Hollín–Loreto, km 31, Comuna Challua Yacu, 1200 m, 00°43'S, 77°36'W, 8–17 Jan. 1989, *Alvarado 222* (NY); new road to Loreto (56 km S of Baeza), 28 km E of junction with Baeza–Tena Road, 1100 m, 00°50'S, 77°33'W, 21 Dec. 1988, *Hammel & Wilder 17263* (NY); El Chaco Canton, Proyecto Hidroeléctrico Coca, Punto ST3, margen derecha del Río Quijos, 1500 m, 00°11'S, 77°39'W, 3–5 Oct. 1990, *Palacios 5805* (QCNE); El Chaco Canton, Proyecto Hidroeléctrico Coca, Punto ST4, margen derecha del Río Quijos, ca 10 km al sur de Reventador, 1450 m, 00°08'S, 77°30'W, 6–10 Oct. 1990, *Palacios 6059* (QCNE). **Pastaza:** Hacienda San Antonia del Barón von Humboldt, 2 km al NE de Mera, 1300 m, 01°27'S, 78°06'W, 27 Feb.–19 Mar. 1985, *Baker, Neill, Palacios & Zaruma 5662* (MO, NY, QAME); along road from Puyo to Macas, ca. 33 km S of Puyo, 24.9 km S of Veracruz, 16 km S of Escuela Fiscal Cotopaxi, disturbed primary forest, 900 m, 01°38'S, 77°52'W, 3 May 1984, *Croat 58946* (NY).

**Larnax psilophyta** N. W. Sawyer, sp. nov. TYPE: Ecuador. Zamora-Chinchipec: Nudo de Sabanilla, pass on road from Yangana to Valladolid, 2800–2900 m, elfin forest and clearings, 5 Apr. 1985, *Harling & Andersson 23724* (holotype, NY). Figure 2.

Species rarissima a loco unico cognito inter quaterni species ceteris generis fructibus involutis arte calyce. Ab caulibus, ramis, et foliis glaberis omnino, foliis induratis ambo apice et base acutato, floribus parvulis usque 6 mm longis, corolla viridia-alba, antheris exsertis, calyce fructifero rotundo tantum 7 mm in diametro a speciebus descriptis fructibus involutis arte calyce notis bene distincta.

Suffrutescent perennial, 1–2 m tall. Stems branched, secondary branches geniculate. Stems and leaves entirely glabrous. Leaves somewhat indurate–fleshy, entire, elliptic, 4–5 cm long, 1–2 cm wide with 3–4 secondary veins prominent abaxially, apex acute, base cuneate, oblique; minute, stalkless, unicellular red glands occurring abaxially toward the leaf base. Petiole glabrous, 5–7 mm long. Inflorescence axillary, 1–3 flowers per node in fascicles from a much reduced peduncle, pendent on glabrous pedicels 6–7 mm long. Flowering calyx glabrous except at the apex where short hairs may be present, green, 1.5 mm long, 2.5 mm wide, margin broadly pyramidal at the 5 major veins. Corolla campanulate–rotate, 4.6–6.4 mm long, tube 1.5–2.8 mm long, lobes of the limb coriaceous, ovate–triangular, reflexed, margins and apex puberulent,



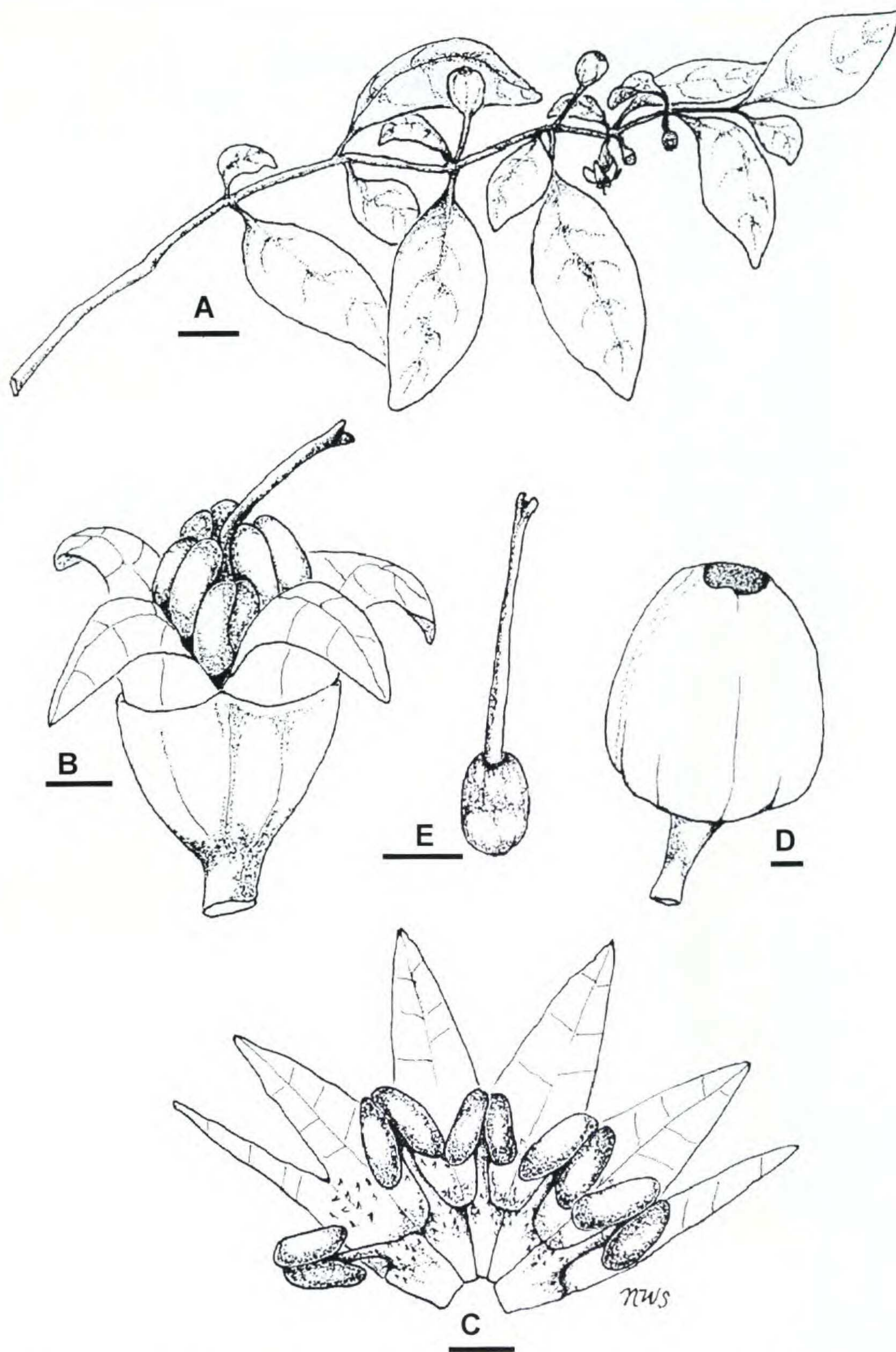


Figure 2. *Larnax psilophyta* N. W. Sawyer (Harling & Andersson 23724). —A. Branch apex. Bar = 1 cm. —B. Mature flower. —C. Interior of mature corolla and androecium. —D. Mature fruiting calyx. —E. Mature gynoecium with annular nectary at base. Bars B–E = 1 mm.

otherwise glabrous without, nonglandular, pluricellular finger hairs present in an annular ring at anther level within. Corolla pale yellow–cream–green. Stamens included. Filaments glabrous–puberulent, filamentose–ribbon-like, the free portion 1–1.5 mm long, adnate to the basal third of the corolla and there broadened and thickened forming a stamen petalum with extended shoulders, separated from each other by the corolla vasculature, the fused

portion 0.8–1.4 mm long. Anthers white, ovate, minutely apiculate or, more commonly, without apiculum, occurring in two size arrays of three large and two small, 1.2–1.6 mm long, 1 mm wide, slightly dorsifixed, base somewhat sagittate. Ovary glabrous, ovate, 1 mm long, less than 1 mm wide, ringed basally by a greenish yellow nectary. Style glabrous, 3–4 mm long, extended beyond anthers late in anthesis; stigma clavate–subbilobate, green.



Fruiting pedicels glabrous, to 10 mm long, raising the mature fruit above the leaf plane. Fruiting calyx accrescent, tightly enveloping the fruit, open at the apex, green, glabrous, membranous, globose, 7 mm diam. with scattered, 2-celled, glandular hairs within; teeth short yet distinct, triangular, acute, <1 mm long. Fruit an orange, fleshy berry containing about 30, reniform, faveolate seeds to 2.6 mm diam.

Diagnostic characteristics for this species include the geniculate younger stems as in *L. andersonii*, the glabrous nature of the plant, the indurate leaves with acute apex and base, and the very small greenish white flowers. *Larnax psilophyta* is found at higher elevations than other known *Larnax* species and appears to be limited in occurrence to the Parque Nacional Podocarpus and the Nudo de Sabanilla areas of southern Ecuador. The specific epithet invokes the smooth texture of the foliage resulting from the combined effects of the indurate and glabrous conditions found in the foliage. This species has been consistently confused with *Deprea glabra*, another glabrous species found at high elevations in Ecuador. However, *D. glabra* has several features that allow it easily to be distinguished from *L. psilophyta*, viz., falcate leaves with attenuate base, a denser ring of pubescence within the much larger corolla tube, anthocyanins that are always present in the corolla, anther thecae with bases that are connate rather than sagittate, and a northerly Ecuadorian distribution.

**Distribution.** Endemic to the elfin cloud forest of the Parque Nacional Podocarpus and the Nudo de Sabanilla pass region at the border of Zamora-Chinchipe and Loja provinces in southern Ecuador, from 2500 to 3000 m.

**Paratypes.** ECUADOR. **Loja:** Parque Nacional Podocarpus, new road Loja–Zamora, E of Cerro Yanococha, montane forest along former Indian trail to Zamora, slightly disturbed, 2550–2650 m, 3°59'S, 79°07'W, 26 Nov. 1988, *Madsen 75581* (AAU, LOJA, QCA, QCNE). **Loja/Zamora-Chinchipe:** Parque Nacional Podocarpus, Road Yangana–Valladolid, km 21, vicinity of sample plot, 2700–2800 m, 4°28'S, 79°09'W, 24–25 Jan. 1989, *Madsen 85661* (AAU, LOJA, QCA, QCNE); Road Yangana–Valladolid, at entrance of Parque Nacional Podocarpus, 2500–3000 m, 4°28'S, 79°10'W, 10 Dec. 1989, *Madsen 86688* (AAU, LOJA, QCA, QCNE); Parque Nacional Podocarpus, pass on road Yangana–Valladolid (Nudo de Sabanilla), 2750–2900 m, 4°27'S, 79°08'W, 28 Feb. 1985, *Øllgaard et al. 58374* (AAU, LOJA, QCNE); Parque Na-

cional Podocarpus, Road Yangana–Valladolid, km 21, vicinity of sample plot, 2560 m, 4°28'S, 79°09'W, 31 July 1996, *Sawyer 770* (CONN, LOJA); Province boundary, pass over Nudo de Sabanilla, elfin forest, 2740 m, 4°27'S, 79°10'W, 11 May 1985, *Stein & D'Alessandro 2733* (K, NY).

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